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Amendments to Claims

Please amend the claims as follows:

- 1.(currently amended) A method of depositing an optical quality silica film on a substrate, comprising:
wherein said forming said optical quality silica film is deposited on said substrate by plasma enhanced chemical vapor deposition (PECVD) at temperature between 100 and 650°C in the presence of a silicon-containing gas, an oxygen-containing gas, and a carrier gas, comprising:
_____ a) fixing the flow rate of said silicon-containing gas, an oxygen-containing gas, and said carrier gas at predetermined values;
_____ b) depositing silica films on said substrate at different total deposition pressures of said gases between 2.0 and 2.6 Torr;
_____ c) observing the optical characteristics of the deposited silica films to determine the optimum total deposition pressure;
_____ d) depositing said optical quality silica film while controlling said total deposition pressure to said optimum total deposition pressure determined in step c) while controlling the total pressure of said gases; and
_____ e) subjecting the as-deposited said deposited optical quality silica film to a low temperature treatment between 400° to 1200°C to minimize the presence of contaminant compounds in said film.
- 2.(currently amended) A method as claimed in claim 1, wherein said total pressure is controlled selected to minimize the presence of $\text{Si-O}_x\text{-H}_y\text{-N}_z$ compounds after said low temperature treatment.
- 3.(original) A method as claimed in claim 2, wherein said low temperature treatment is about 800°C.
- 4.(cancelled)
- 5.(currently amended) A method as claimed in claim 43, wherein said total gas pressure is about 2.4 Torr.

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6.(original) A method as claimed in claim 4, wherein said film is deposited in a vacuum chamber whose pressure is maintained by a vacuum pump having a controllable pumping speed, and said total gas pressure is maintained by controlling said pumping speed.

7.(original) A method as claimed in claim 4, wherein said film is deposited at a temperature between 100 and 650°C.

8.(original) A method as claimed in claim 7, wherein said film is deposited at a temperature of about 400°C.

9.(cancelled)

10.(currently amended) A method as claimed in claim 9~~1~~, wherein said ~~reactive-silicon-containing~~ gas is selected from the group consisting of: silicon tetrachloride, SiCl₄, silicon tetrafluoride, SiF₄, disilane, Si₂H₆, dichloro-silane, SiH₂Cl₂, ~~and~~ difluoro-silane, SiH₂F₂ ~~and any other silicon-containing gases involving the use of hydrogen, H₂, chlorine, Cl₂, fluorine, F₂, bromine, Br₂, and iodine, I₂.~~

11.(currently amended) A method as claimed in claim 10, wherein said ~~oxidation-oxygen-containing~~ gas is selected from the group consisting of: oxygen, O₂, nitric oxide, NO₂, water, H₂O, hydrogen peroxide, H₂O₂, carbon monoxide, CO ~~or~~ and carbon dioxide, CO₂.

12.(original) A method as claimed in claim 11, wherein said carrier gas is selected from the group consisting of: helium, He, neon, Ne, argon, Ar or krypton, Kr.

13.(currently amended) A method as claimed in claim 9~~1~~ wherein said ~~raw material~~ silicon-containing gas is SiH₄, said ~~oxidation-oxygen-containing~~ gas is N₂O, and said carrier gas is N₂ ~~carrier-gas~~.

14.(currently amended) A method as claimed in claim 9~~1~~, wherein the ~~predetermined~~ flow rates of said gases are ~~also controlled~~ selected to optimize the quality of the deposited films after said low temperature treatment.

15.(original) A method as claimed in claim 13, wherein the flow rates of said gases are ~~also controlled~~ selected to optimize the quality of the deposited films after said low temperature treatment.

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- 16.(original) A method as claimed in claim 15, wherein the flow rate of the SiH_4 is about 0.2 std liter/min.
- 17.(original) A method as claimed in claim 16, wherein the flow rate of the N_2O is about 6.00 std liter/min.
- 18.(original) A method as claimed in claim 17, wherein the flow rate of the N_2 is about 3.15 std liter/min.
- 19.(original) A method as claimed in claim 1, wherein modifiers are incorporated into said films during deposition to modify the resulting refractive index.
- 20.(original) A method as claimed in claim 19, wherein said modifiers are selected from the group consisting of: Phosphorus, Boron, Germanium, Titanium or Fluorine.
- 21.(currently amended) A method of depositing an optical quality silica film on a substrate comprising:
wherein—forming said optical quality silica film is deposited on said substrate at a temperature between 100 and 650°C by plasma enhanced chemical vapor deposition (PECVD) in the presence of a raw-silicon-containing gas/material-gas, an oxidation-oxygen-containing gas, and a carrier gas, comprising:
a) fixing the flow rate of said silicon-containing gas, an oxygen-containing gas, and said carrier gas at predetermined values;
while controlling the total pressure of said gases to a pressure of between 2.0 to 2.6 Torr; and
b) depositing silica films on said substrate at different total deposition pressures of said gases between 2.0 and 2.6 Torr;
c) observing the optical characteristics of the deposited silica films to determine the optimum total deposition pressure;
d) depositing said optical quality silica film while controlling said total deposition pressure to said optimum total deposition pressure determined in step c; and
e) subjecting said deposited optical quality silica film to a low temperature treatment
subjecting the as-deposited film to a low temperature treatment at about 800°C to minimize the presence of $\text{Si-O}_x\text{-H}_y\text{-N}_z$ compounds after said low temperature treatment.

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22.(original) A method as claimed in claim 21, wherein said film is deposited in a vacuum chamber whose pressure is maintained by a vacuum pump having a controllable pumping speed, and said total gas pressure is maintained by controlling said pumping speed.

23.(original) A method as claimed in claim 21, wherein said film is deposited at a temperature of about 400°C.

24.(currently amended). A method as claimed in claim 21, wherein said raw materials: ~~silicon-containing~~ gas is SiH_4 , said ~~oxidation-oxygen-containing~~ gas is N_2O , and said carrier gas is N_2 ~~carrier-gas~~.

25.(original) A method as claimed in claim 24, wherein the flow rate of the SiH_4 is controlled ~~fixed at to be~~ about 0.2 std liter/min, the flow rate of the N_2O is controlled ~~to be~~ fixed at about 6.00 std liter/min., and the flow rate of N_2 is controlled ~~to be~~ fixed at about 3.15 std liter/min.

26. (new) A method as claimed in claim 1, wherein said characteristics are the FTIR spectra,

27. (new) A method as claimed in claim 21, wherein said characteristics are the FTIR spectra,